

## ABSTARCT OF THE DISCLOSURE

The present invention provides a frequency synthesizer comprising a noise-shaped quantizer and a divider. The noise-shaped quantizer is utilized for quantizing a period control word to a time-varying value. The divider is used for  
5 generating an output signal by means of dividing a reference signal by the time-varying value. The output signal is fed back to the noise-shaped quantizer so that the noise-shaped quantizer generates the time-varying value in response to the feedback output signal. Accordingly, the frequency synthesizer of the present invention can provide a very precise frequency synthesizer featuring very accurate  
10 long-term phase, frequency, and jitter stability.